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FOREWORD

This 1968 volume of *Transactions* of the Society of Petroleum Engineers of AIME presents that technical material, published by the Society during the year, judged to be a part of the permanent literature of the petroleum engineering profession. The year 1968 was an outstanding one in many respects for SPE's operation. Member services were expanded in the fields of publications, continuing education, and meetings, and the Society enjoyed its best year of membership growth in a decade.

At year's end, SPE membership totaled 17,026, a new all-time record. The net gain of 809 members over 1967 represented the largest annual increase since 1958. The 1,316 new-member/reinstatement applications received represented an increase of 87 over the number received in 1967.

SPE's Annual Fall Meeting set an attendance mark for the second consecutive year. A total of 5,030 persons saw the largest technical program and technical-educational exhibits display in the Society's history. SPE conducted, in addition to the Annual Fall Meeting, a numerical simulation symposium, the second in a series of Society-sponsored technical meetings on a subject of restricted interest. A total of 15 regional meetings and student meetings were attended by over 5,000 persons.

The publications program received considerable attention during 1968. *Journal of Petroleum Technology,* the Society's monthly magazine, was redesigned typographically, with the first issue of the new JPT appearing in January, 1969. A record 498 pages was published in the Society's quarterly magazine, *Society of Petroleum Engineers Journal,* and SPE published a record 3,496 pages of preprints for meetings during the year. A special committee was appointed during 1968 to study the Society's Transactions Reprint Series.

A program that continues to be one of the most popular in the Society, the Distinguished Lecturer Series, reached 56 sections during 1968. The eight lecturers presented 125 talks to SPE sections. Lecturers were John M. Campbell, Norman J. Clark, Henry F. Coffer, R. C. Earlougher, C. S. Matthews, D. G. Russell, H. J. Ramey, Jr., and H. K. van Poollen. SPE and the American Association of Petroleum Geologists also combined to sponsor an Interdisciplinary Lecture Series. C. H. Hewitt talked to 11 joint SPE-AAPG meetings during the year.

Continuing education was again a popular member service during 1968. The second video-tape course was produced, and plans were announced for additional courses. Via video-tape, more than 700 members in 12 local sections have taken the courses on reservoir engineering. During 1968, also, 15 local sections conducted continuing education courses.

Major revisions were made in the Society's regional organization plan during the year. The changes reduced the number of administrative regions from twelve to nine and created four new at-large positions on the SPE Board of Directors. The addition of the new at-large positions permits more flexibility in the selection of new directors because at-large directors can be chosen from any geographical area.

During 1968, the Society was instrumental, with the AIME, in developing plans for the Offshore Technology Conference, a major interdisciplinary meeting. The first Conference, which will be co-sponsored by nine leading engineering and scientific societies, will be held in May, 1969.

Society and Institute awards were presented to eight SPE members during the year. Recipients were A. F. van Everdingen, Anthony F. Lucas Gold Medal; David A. T. Donohue and Harvey S. Price, Cedric K. Ferguson Medal; John R. Suman, DeGolyer Distinguished Service Medal; Howard C. Pyle and Floyd E. Schoonover (posthumously), SPE Certificate of Service; George H. Fancher, John Franklin Carll Award; and C. J. Coberly, Sr., Lester C. Uren Award.

A major change also was made in the Society headquarters staff in Dallas. Joe B. Alford, the SPE Executive Secretary since 1950, resigned late in the year to accept the post as AIME Executive Director in New York City. David L. Riley, who had served as Assistant Executive Secretary since 1965, was named to succeed Alford.

H. J. GRUY, President
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A. F. van EVERDINGEN

Lucas Medalist, 1968

"For his part in development of basic fundamentals of petroleum engineering, and his contributions to better understanding of the nature of oil recovery from reservoir rock."

THE ANTHONY F. LUCAS GOLD MEDAL

In 1936 the Institute established the Anthony F. Lucas Gold Medal, to be awarded from time to time "for distinguished achievement in improving the technique and practice of finding and producing petroleum". These awards are sponsored by the Society of Petroleum Engineers of AIME. Members of the Committee of Award of the Lucas Medal are: R. C. Earlougher, Chairman, Richard A. Morse, Wayne E. Glenn, Harold S. Kelly, Donald L. Katz, James E. Russell, Jan J. Arps and John C. Calhoun, Jr.

MEDALS AWARDED

J. Edgar Pew, 1937

Henry L. Doherty, 1938

E. DeGolyer, 1940

Conrad (Posthumously) and Marcel Schlumberger, 1941

John Robert Suman, 1943

Charles Van Ormer Millikan, 1944

James Ogier Lewis, 1946

William Noble Lacey, 1947

Wallace Everette Pratt, 1948

William Embry Wrather, 1950

Morris Muskat, 1953

Bruce H. Sage, 1954

Stuart E. Buckley, 1956

John Edward Brantly, 1957

Carl E. Reistle, Jr., 1958

John T. Hayward, 1959

A. C. Rubel, 1960

E. O. Bennett, 1961

John E. Elliott, 1962

Lyon F. Terry, 1963

William Hurst, 1964

Ralph D. Wyckoff, 1965

Lloyd E. Elkins, 1966

John E. Sherborne, 1967

Harvey S. Price

David A. T. Donohue

THE CEDRIC K. FERGUSON MEDAL

Harvey S. Price and David A. T. Donohue are the co-recipients of the 1968 Cedric K. Ferguson Medal for their paper, "Isothermal Displacement Processes With Interphase Mass Transfer", published in the June, 1967, issue of SOCIETY OF PETROLEUM ENGINEERS JOURNAL and *Transactions* volume 240. The Ferguson Medal was first awarded posthumously to Cedric K. Ferguson in 1954. Co-recipients in 1956 were William M. Campbell and the late John L. Martin. W. O. Brown received the medal in 1957. Jim Douglas, Jr., Phillip M. Blair and R. J. Wagner were joint recipients in 1958. Henry J. Ramey, Jr., received the medal in 1959; Charles B. Ammann, 1960; Fred H. Brinkman, 1961; D. G. Russell, 1962; G. W. Swift and O. G. Kiel, 1963; E. L. Dougherty, 1964; Bobby F. Abernathy, 1965; Necmettin Mungan, 1966; and John E. Cochrane, 1967.

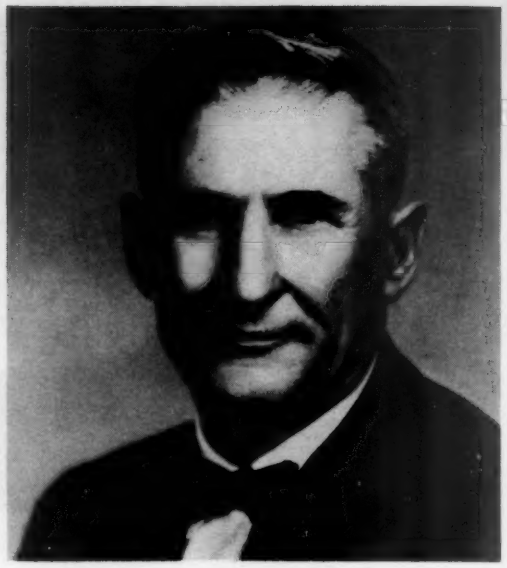
The purpose of the medal is to recognize the writing of an outstanding technical paper by a young member or members (under 33 years of age) of the profession.

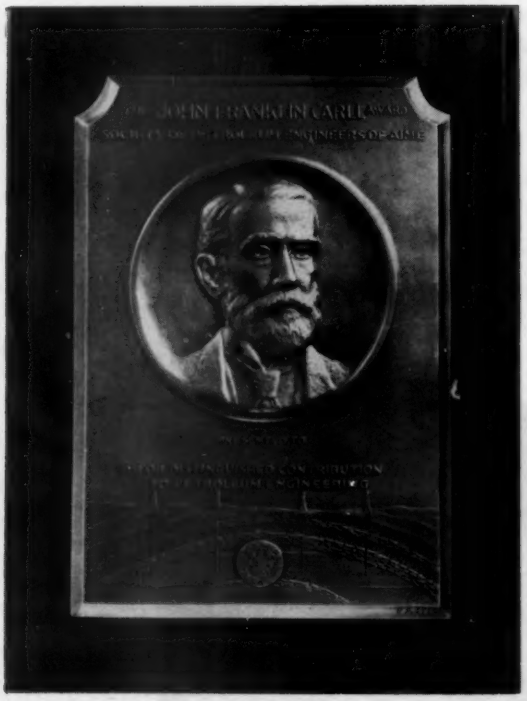
The medal is presented annually unless waived for lack of a worthy candidate. Members of the 1968 Cedric K. Ferguson Medal Committee are Oren C. Baptist, Chairman, H. K. van Poollen and Michael Prats.

GEORGE H. FANCHER

John Franklin Carll Award, 1968

"In recognition of his creative achievements in petroleum research and prolific contributions to the petroleum engineering literature, and for his unique and wide-ranging influence in the field of petroleum engineering."





THE JOHN FRANKLIN CARLL AWARD

Established in 1956 and first presented in 1957, the John Franklin Carll Award is presented "to recognize distinguished achievement in or contributions to petroleum engineering". The medal commemorates John Franklin Carll (1828-1904) whose ideas and writings first expressed principles of petroleum engineering that are now considered commonplace. Herbert C. Otis, Sr., was the first recipient of the award in 1957; Gen. E. O. Thompson in 1958; Eugene A. Stephenson, 1959; Ralph J. Schilthuis, 1960; Hallan N. Marsh, 1961; C. E. Beecher, 1962; Robert E. Hardwicke, 1963; Donald L. Katz, 1964; Douglas Ragland, 1965; Herman H. Kaveler, 1966; and D. V. Carter, 1967. Members of the 1968 John Franklin Carll Award Committee are R. C. Granberry, Jr., Chairman, Richard L. Evans, Henry F. Coffer, Charles F. Gallagher, J. P. Moran and W. R. McElroy.

C. J. COBERLY

Lester C. Uren Award, 1968

"In recognition of his many contributions to the advancement of petroleum engineering technology and particularly for his outstanding work in the design of sand exclusion liners and the design and development of hydraulically operated oilwell pumping systems."

THE LESTER C. UREN AWARD

Established in 1963, the Lester C. Uren Award honors professional engineering achievement. The award commemorates Lester C. Uren, an internationally known engineering educator and author who died in 1960. His lengthy record of research accomplishments is basic to the understanding of the science of petroleum engineering as it is known and practiced today. The first award was presented posthumously to Uren. Gustave E. Archie received the award in 1964; Marshall B. Standing was the 1965 recipient; and Fred H. Poettmann was the recipient in 1966. J. B. Clark, Jr., George C. Howard, R. Floyd Farris and C. Robert Fast were joint recipients in 1967. Members of the 1968 Lester C. Uren Award Committee are John A. Murphy, Chairman, R. E. Eddy, L. W. Welch, Jr., N. van Wingen, Gene E. Roark and Martin Felsenthal.

JOHN R. SUMAN

DeGolyer Distinguished Service Medal, 1968

"In recognition of his distinguished contributions to the engineering profession and to the petroleum industry as author, engineer and executive, and in deep appreciation of his more than 50 years of devoted service and creative leadership in many activities of the Society of Petroleum Engineers of AIME."

SOCIETY OF PETROLEUM ENGINEERS CERTIFICATE OF SERVICE

Established in 1948, the Society of Petroleum Engineers Certificate of Service is awarded "to recognize contributions to SPE that exhibit such exceptional devotion of time, effort, thought, and action as to set them apart from other contributions and thereby create an added indebtedness of the Society to the contributor". Members of the 1968 Certificate Award Committee are Ben P. Bayliss, Chairman, Hugh B. Barton and James A. McCarty.

THE DEGOLYER DISTINGUISHED SERVICE MEDAL

In 1965 the Society of Petroleum Engineers of AIME established the DeGolyer Distinguished Service Medal to be awarded from time to time "to recognize distinguished and outstanding services to the AIME and the Society, to the professions of engineering or geology and to the petroleum industry". The silver medal was first presented posthumously in 1966 to Everette Lee DeGolyer, whose accomplishments in the petroleum industry are legendary. John M. Lovejoy was the recipient in 1967. Members of the 1968 DeGolyer Distinguished Service Medal Committee are Gail F. Moulton, Chairman, Richard W. French, Claude R. Hocott, Charles A. Warner, G. R. Brainard, Jr., and John D. Albright.

FLOYD E. SCHOONOVER

Certificate of Service, 1968
(Posthumously)

"In recognition of his outstanding and unique contribution to the Society and in tribute to a distinguished friend of the Society; and particularly for the monumental and lasting contribution he has made toward programs for Continuing Education of the Society Membership on local, regional and national levels."

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ERRATA

The following corrections have been noted for "Transient Stresses and Displacement Around a Wellbore Due to Fluid Flow in Transversely Isotropic, Porous Media: II. Finite Reservoirs", beginning on Page 79, Part II.

Eq. 28 on Page 82 should read

$$p_D(r_D, 0) = p_{eD}$$

The second term in Eq. 29 should read

$$\frac{p_{eD} - 1}{\ln r_{eD}} \ln r_D$$